Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An apparatus for sampling timing compensation at a receiver of a communication system, wherein each of a first symbol and a second symbols comprising at least two pilot signals transmitted via a first and a second pilot subchannels respectively, and the first and the second pilot subchannels comprise a first and a second pilot indexes respectively, the apparatus comprising:

   a pilot subchannel estimator for generating a first frequency response of the first and the second symbols according to the pilot signals of the first and the second symbols transmitted over the first pilot subchannel and a second frequency response of the first and second symbols according to the pilot signals of the first and second symbols transmitted over the second pilot subchannel ~~respectively~~;

   a timing offset estimator, coupled to the pilot subchannel estimator, for calculating a timing offset according to a difference between the first and second frequency response ~~the sampling frequency offset, wherein the sampling frequency is generated according to the frequency responses of the first and the second symbols~~; and

   a phase rotator, coupled to the timing offset estimator, for performing sampling timing compensation according to an phase rotation corresponding to the timing offset.

2. (Original) The apparatus of claim 1, wherein the communication system is a multi-carrier system.

3. (Currently Amended) The apparatus of claim 1, wherein the timing offset estimator further comprises a phase difference calculating device for calculating a phase

difference between the first and second frequency responses ~~of both the first and the second symbols~~, and a divider for calculating [[a]] the timing offset ~~through dividing~~ according to the phase difference [[by]] and a difference [[of]] between the first and the second pilot indexes.

4. (Cancelled)

5. (Withdrawn) The apparatus of claim 1, further comprises:

a timing controller for generating a control signal according to the timing offset; and

a cyclic prefix remover for removing a cyclic prefix of the symbol according to the control signal.

6. (Original) The apparatus of claim 1, further comprising:

a timing controller for generating a control signal according to the timing offset;

a clock generator for generating a sampling clock according to the control signal, wherein the phase of the sampling clock is adjusted according to the control signal; and

an analog-to-digital converter (ADC) for converting the symbol according to the sampling clock.

7. (Currently Amended) The apparatus of claim 6, wherein a period of the sampling clock (T_f) is shorter than [[the]] a sampling interval (Ts) of the ADC.

8. (Currently Amended) The apparatus of claim 7, wherein the period of the sampling clock (T_f) is a fraction of the sampling interval (T_s) of the ADC.

9. (Original) The apparatus of claim 6, wherein the clock generator further comprises a phase-locked loop (PLL) circuit.

10. (Currently Amended) A method for sampling timing compensation used at a receiver of a communication system, wherein each of a first symbol and a second symbol

comprising at least two pilot signals transmitted via a first and a second pilot subchannels respectively, and the first and the second pilot subchannels comprise a first and a second pilot indexes respectively, comprising:

generating a first frequency response of the first and the second symbol according to the pilot signals of the first and the second symbols transmitted over the first pilot subchannel ~~respectively~~;

generating a second frequency response of the first and the second symbol according to the pilot signals of the first and the second symbols transmitted over the second pilot subchannel;

~~generating the sampling frequency according to the frequency responses of the first and the second symbols;~~

calculating a timing offset according to a difference between the first and second frequency response ~~sampling frequency offset~~; and

performing sampling timing compensation according to a phase rotation corresponding to the timing offset.

11. (Currently Amended) The method of claim 10, further comprising:

generating a sampling frequency offset according to the difference between the first and second frequency responses and thereby calculating the timing offset according to the sampling frequency;

wherein the difference is a phase difference.

~~wherein the sampling frequency offset is generated through calculating a phase difference between the frequency responses of both the first and the second symbols.~~

12. (Currently Amended) The method of claim 11, wherein the timing offset is calculated ~~through dividing~~ according to the phase difference [[by]] and a difference [[of]]

between the first and the second pilot indexes.

13. (Cancelled)

14. (Cancelled)

15. (Withdrawn) The method of claim 10, further comprising:

generating a control signal according to the timing offset; and

removing a cyclic prefix of the symbol according to the control signal.

16. (Currently Amended) The method of claim 10, further comprising:

generating a control signal according to the timing offset; and

generating a sampling clock according to the control signal, wherein [[the]] a phase of the sampling clock is adjusted according to the control signal~~; and~~

~~converting the symbol according to the sampling clock~~.

17. (Cancelled)

18. (Currently Amended) An apparatus for sampling timing compensation at a receiver of a communication system, wherein each of a first symbol and a second symbol comprising at least two pilot signals transmitted via a first and a second pilot subchannels respectively, and the first and the second pilot subchannels comprise a first and a second pilot indexes respectively, the apparatus comprising:

a pre-FFT processing device for processing the first and the second symbols in a time domain;

a FFT for transforming the first and the second symbols to a frequency domain;

a pilot subchannel estimator for generating a first frequency response of the first and the second symbols according to the pilot signals of the first and the second symbols transmitted over the first pilot subchannel and a second frequency response of the first and second symbols according to the pilot signals of the first and second

symbols transmitted over the second pilot subchannel ~~respectively~~;

a timing offset estimator, coupled to the pilot subchannel estimator, for calculating a timing offset according to ~~the sampling frequency offset, wherein the sampling frequency is generated according to~~ a difference between the first and second frequency responses ~~of the first and the second symbols~~;

a phase rotator, coupled to the timing offset estimator, for performing sampling timing compensation according to an phase rotation corresponding to the timing offset; and

a adjusting device for adjusting the operation of the pre-FFT processing device.

19. (Original) The method of claim 18, wherein the pre-FFT processing device includes an ADC.

20. (Original) The method of claim 19, wherein the adjusting device includes:

a timing controller for generating a control signal according to the timing offset; and

a clock generator for generating a sampling clock according to the control signal for controlling the operation of the ADC, wherein the phase of the sampling clock is adjusted according to the control signal.

21. (Withdrawn) The method of claim 18, wherein the pre-FFT processing device includes a cyclic prefix remover.

22. (Withdrawn) The method of claim 21, wherein the adjusting device includes a timing controller for generating a control signal for controlling the operation of the cyclic prefix remover according to the timing offset.

23. (Currently Amended) An method for sampling timing compensation at a receiver of a communication system, wherein each of a first symbol and a second symbol comprising at least two pilot signals transmitted via a first and a second pilot subchannels respectively, and the first and the second pilot subchannels comprise a first and a second pilot indexes respectively, the method comprising:

processing the first and the second symbols in a time domain;

transforming the first and the second symbols to a frequency domain;

generating a first frequency response of the first and the second symbols according to the pilot signals of the first and the second symbols transmitted over the first pilot subchannel and a second frequency response of the first and second symbols according to the pilot signals of the first and second symbols transmitted over the second pilot subchannel ~~respectively~~;

calculating a timing offset according to ~~the sampling frequency offset, wherein the sampling frequency is generated according to~~ a difference between the first and second frequency responses ~~of the first and the second symbols~~;

performing sampling timing compensation according to an phase rotation corresponding to the timing offset; and

adjusting the operation of the step of processing symbols in the time domain.